Food and Agriculture Organization of the United Nations

Policy brief

Grazing with trees

A silvopastoral approach to managing and restoring drylands with trees

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The planetary processes that make human life viable are being stretched to its limit.

Global change – including population growth, urbanization, land use change and climate change – is increasingly disturbing the equilibrium of the world's drylands. Growing numbers of people are dependent on natural resources for their survival, against a background of advancing land degradation, weakened traditional governance and the intensified and unsustainable extraction of key resources, threatening the long-term viability of drylands. Instead of being considered as assets and caretakers of their lands, local communities are often blamed for land degradation, accused of overgrazing and deforestation, and are increasingly being evicted and marginalized from the lands that support their livelihoods. Worrisome as this situation is, the natural resources of drylands have proven to be stronger than expected, and local management wiser and more resilient than previously considered.

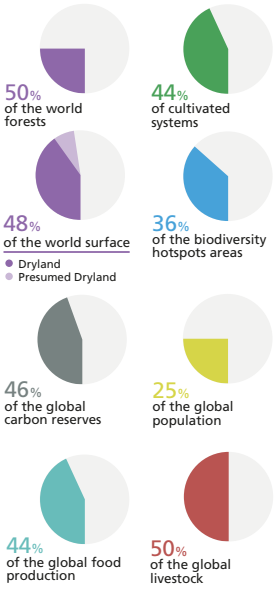
The FAO 2018 report, World Livestock: Transforming the livestock sector through the Sustainable Development Goals, shows that converting other ecosystems, especially forests, to produce fodder will have serious repercussions for people and the environment. This is particularly significant as over a third of the world's cropland is being used to grow animal feed (FAO, 2018; 2020; Mottet *et al.*, 2017). While under- and overgrazing can lead to desertification, shrub encroachment and lower biodiversity levels, the rehabilitation of degraded lands and creation of expansive agroforestry with better grazing management can boost agricultural productivity, increasing useable surfaces by another billion hectares (FAO, 2022; HLPE, 2019).

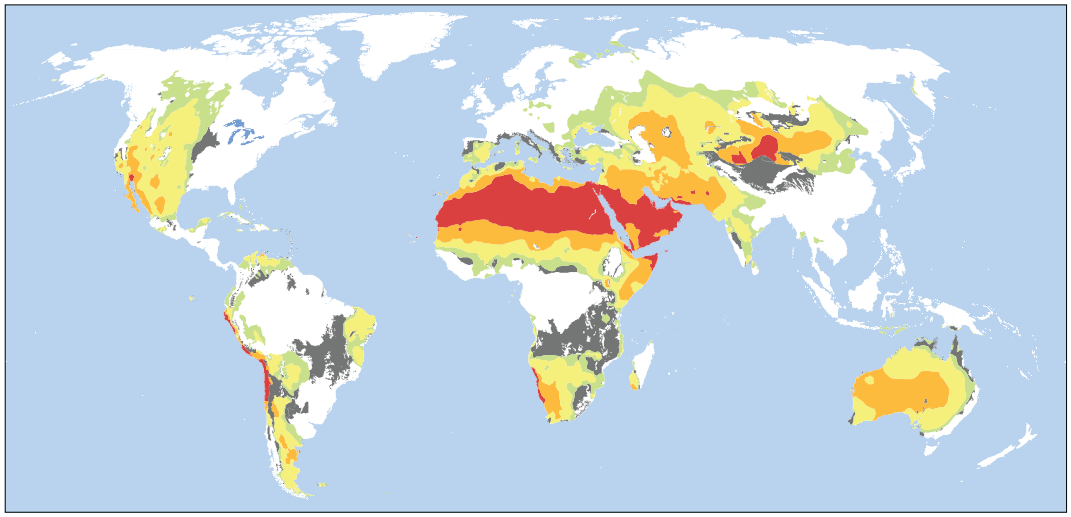
Although the 2020 Forest Resource Assessment survey confirms a slowdown in global deforestation, dryland forests in Africa represented the area with the second-highest level of deforestation globally in the period 2000–2018, with 49 Mha, after South America with 68 Mha of total deforestation. Cropland expansion (including oil palm plantations) is the main driver of deforestation, accounting for almost 50 percent in global terms, followed by the impact caused by livestock (mostly referring to extractive grazing systems), at 38.5 percent.

People living in dryland forests and rangelands are usually permitted to graze their livestock there, although pastoralist activity has frequently been neglected by forest policies, and pastoralism and forestry have often been considered mutually exclusive. Forestry policies have tended to promote afforestation over large dryland surfaces and ban grazing, while neglecting the key role of woody vegetation in pastoral systems. Fortunately, the tide is turning, with the silvopastoral approach making key advances. For instance, agricultural policies are now recognizing pastoralism as an alternative for rural people, while forestry policies are shifting from pure afforestation towards mixed approaches allowing for grazing inside and outside the forests.

Grazing is often considered a threat to forest and landscape sustainability. Multifaceted agroforestry approaches such as silvopastoralism, integrating livestock farming and forest management, have been operating for centuries in the world's drylands and successfully providing for their ecosystems and their inhabitants' needs, although this has mostly been overlooked by researchers and policy-makers until recently. Local knowledge preserved by communities and enhanced by research and innovation, could generate effective nature-based solutions that simultaneously address food security and the livelihoods of local populations, while safeguarding the ecosystem services that drylands provide and developing new and robust tools available to adapt to change, thus restoring dryland ecosystems, and achieving land degradation neutrality.

Drylands: the future at play


50% of the world forests
44% of cultivated systems
48% of the world surface
Dryland
Presumed Dryland
36% of the biodiversity hotspots areas
46% of the global carbon reserves
25% of the global population
44% of the global food production
50% of the global livestock



Source: UN Map, 2018; UNEP-WCMC, 2007

Agroforestry as a primary pathway for forest restoration in dryland areas: Findings from dryland regions that have introduced trees to their agropastoral systems show impressive results. For example, microclimate measurements show lower soil temperatures in pastures with trees (between 2.2 and 2.3 degrees at 5 cm from the surface).

- In India, the Jhansi dryland areas have increased their production tenfold using a ten-year silvopastoral rotation plan (Yadav *et al.*, 2019).
- In Senegal, hundreds of villages have been protecting their common grazing lands over the last 30 years, transforming degraded shrubs into savannah landscapes and increasing woody cover by up to 65 percent (Pasiecznik and Reij, 2019).
- An FAO study in Argentina, Chad, and Mongolia demonstrated the multifaceted contribution of livestock grazing in woody and grasslands to socioeconomic wellbeing, especially in remote areas at between 40 and 90 percent of total cash income. Animals, milk, hides and so on represent between 38 and 74 percent of monetary income, while self-consumption represents between 8 and 37 percent of additional income (Wane *et al.,* 2020).
- In Nigeria, livestock keepers possess useful knowledge of fodder tree species that should be integrated into their landscape. An analysis of four different grazing-based livestock systems, from extensive to semi-intensive, concluded that 48 percent of them used fodder from trees and shrubs during the dry season and 91 percent during the rainy season (Lawal *et al.,* 2020).
- In Australia, research demonstrated that the economic potential of implementing silvopastoral systems (SPS) in private native spotted gum regrowth forests was substantially higher than that of reclearing it for cattle production (Francis *et al.*, 2022).
- In Latin America, pasture-based cattle farms increased their forage production by over 175 percent and their milk production per hectare by over 75 percent after incorporating trees into the local environment (Chará *et al.,* 2020).

- Economic analysis of various intensified SPS in Latin America found that the income generated was far higher than the investment in all cases, with several stakeholders reporting remarkable profits of USD 1 500 or more per hectare, clearly demonstrating that SPS can be financially solid (Chará *et al.*, 2019).

The multifunctionality, resilience and adaptation capacity of silvopastoral approaches make them a key instrument to securing food and improving livelihoods in the world drylands, especially in the most marginal rural areas.

The United Nations (UN) Food Systems Summit, held in September 2021, highlighted – under Action Track 3 "Boost nature-positive production" – the importance of making livestock nature-positive and more resilient to shocks. It also proposed innovations to halt deforestation through livestock management and to reduce emissions from livestock, thus mitigating climate change (UN, 2021).

The UN-designated International Year of Rangeland and Pastoralists in 2026 will encourage everyone to join efforts towards dryland restoration through many of the pathways highlighted in the report. Long-term policies aimed at creating sustainable and green jobs in dryland areas, and empowering local women, youth and Indigenous Peoples to take a leading role in land restoration initiatives, are the backbone of a new approach to drylands management.

Silvopastoralist strategies are particularly relevant in dryland areas with forests, woodlands, and mosaics of different land uses and tenure schemes. These complex areas are the most suitable territories in which to develop silvopastoral strategies, by unifying efforts to boost sustainability and land degradation neutrality. However, due to some key characteristics of silvopastoralism, such as its links between other land uses and the weakness of pastoral land tenure in many places, it is highly dependent on strong participatory governance systems that can only thrive under equitable policies. To this end, legal frameworks should address the multifunctionality of SPS, the concurrence of multiple stakeholders and interests, the key role of common lands, and the dependence on optimized planning and management.

Those complex scenarios have been traditionally managed at local level, but the increasingly decisive role of governments and the progressive weakening of local and traditional institutions have led to failure of local governance and ultimately to the abuse, abandonment, and degradation of local silvopastoral systems.

Turning the tide on forest and land degradation and recovering the active role of silvopastoralism in ecosystem restoration and services provision demand new country and region-level policy developments, with a focus both on people and the land they manage.

The "*Grazing with trees*" report builds a new narrative around the relationship between forests and livestock in drylands, and explores innovation in the relationship between forests and livestock in a bid to improve interconnection – compiling and assessing practices that demonstrate the wide-ranging social, economic and ecological benefits of silvopastoralism. It analyses and updates an old and forgotten path to sustainable land management that never saw people, animals, trees and the land as separate phenomena, but rather addressed them as a whole system intimately linked to the way of life, culture and health of its inhabitants.

First advances: what policies can do

"Grazing with trees" lays the foundation for a clear roadmap to the benefits provided by livestock in managing dryland forests and silvopastoral systems. It draws evidence from research into the experiences of 17 case studies from five continents and key regions of the world's drylands, and sourcing valuable knowledge from people on the ground.

It is often difficult to implement policy initiatives in areas with daunting social, economic and environmental challenges. In addition to major global challenges, such as climate change and poverty, certain challenges are also specific to dryland management: degradation scenarios where lands lack regulation and governance, leading to unregulated free-range all-year-around grazing livestock incompatible with the structure and dynamic of those landscapes. These conditions make it hard to develop legal

frameworks that promote both silvopastoralism in dryland forests and management tools that control degradation. These challenges have been acknowledged by Lebanon and Morocco, with both countries already starting to implement silvopastoral strategies and laws to support the grazing of trees in and outside forests. Other evidence collected from various countries across dryland regions has highlighted the possibility of integrated forestry-pastoralism approaches, which offer several clues about the needs, tools and conditions necessary to build effective policies supporting silvopastoralism and restoring its landscapes.

Co-producing knowledge

Significant evidence from the case studies explored in the main report shows the benefits of co-producing and enhancing knowledge and linking traditional knowledge with science, research and innovation – while always keeping local producers at the heart of co-construction efforts. The report showcases Uzbekistan's field schools, Burkina Faso's pilot farms with training and Chile's community cultural centres, all of which position knowledge at the centre of silvopastoral development.

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Land rights and land tenure

A second instrumental step for policymaking is securing land rights and land tenure of silvopastoral lands, acknowledging the multifaceted and complex nature of the resources managed and highlighting the overlaps and interlinkages between the rights of various groups. Brazil's and Senegal's case studies illustrate this – promoting secure rights and better recognition of silvopastoral considerations. Meanwhile, other case studies focus specifically on rights in common lands and the need for sound legal and governance frameworks.

Improved governance and local institutions

Improved governance through enhancing and updating the role of local institutions is another conclusion shared in most case studies. The report explores examples in Chile, Tunisia, Jordan and the Islamic Republic of Iran, illustrating how reinforcing and updating traditional institutions can improve the governance of silvopastoral areas through participatory planning structures. Policies should build capacity at a local level and address governance issues.

Participation

The report is clear that policy frameworks should promote silvopastoral land management based on holistic approaches that encourage efficiency and adaptation.

In particular, all the case studies agree on the importance of participation, with silvopastoralists playing a key role in policy, decision making, land planning and management, and boosting the social capital of local communities, whether via grassroots organizations, empowerment or representation. The vast majority of the case studies emphasize the need to apply inclusive policies and a gender perspective. The crucial part played by women in silvopastoral systems is often forgotten, and policies must specifically address and recognize their potential. The same applies to other groups such as nomads, transhumants, elders, and youth.

Finally, the social and economic performance of silvopastoralism also requires negotiation, conflict solving and the conciliation of different interests under a common legal framework.

A practical approach

Some experience-based lessons learned from the report can help shape further initiatives. First, coordination and integration between forestry and animal-focused institutions is essential to applying a multidisciplinary perspective. Second, sound data on silvopastoral systems and land use are essential for the diagnosis and proper assessment of the needs and challenges. Third, there is a need for holistic approaches that simultaneously address production, restoration and wellbeing goals as a path to improving trade-offs and balancing different interests in win-win scenarios. Finally, providing forthcoming policies with the basic resources for planning, implementation and especially the monitoring and evaluation of planned actions will favour more integrated policy.

A common vision

The development of a shared perspective for the management of forests and rangelands involving various agents and groups is a must for starting any successful policy-making initiative on silvopastoralism. The cases and conclusions presented in “Grazing with trees” illustrate a path forward towards new and sustainable policies that support both silvopastoralism and drylands.

A path towards integrating forests, trees and livestock

The various examples highlighted in this paper demonstrate that silvopastoralism is one of the most innovative solutions in drylands, playing a compelling role not only in improving productivity and income but also in protecting the soil from further degradation, while improving soil sustainability and other ecosystem features. Moreover, a number of indicators suggest a common path for developing silvopastoralism management in drylands: diversified productions and multifunctional landscapes, collective multistakeholder action, integration of forestry, agriculture, and livestock farming under agroecological principles, territorialization and self-sufficiency, and balanced trade-offs.

The adaptation of these paths to each territory is a task that should be accomplished locally, with legal, technical and political support at different levels of government, research and expertise.

Key required actions include the following:

- Develop participatory silvopastoral policies and strategies at different political levels, including transboundary and international agreements.
- Collectively design, with the different stakeholders involved, sound grazing strategies suitable for incorporation into forest management.
- Secure and balance the use and access of crop, pastoral, and forestry areas within laws and regulations governing land tenure and enhancing the governance systems traditionally developed in pastoral lands.
- Build the awareness, capacity, engagement, and social skills of

silvopastoralists through specific programmes.
- Generate the conditions to allow silvopastoralists to participate fully in policy development and governance.
- Support the creation and operation of specific silvopastoralist organizations: grassroots, commercial networks, women's organizations, and so on.
- Provide local communities and institutions with facilitation, conflict-solving, and technical support to collectively respond to new challenges.
- Prioritize marginalized groups of silvopastoralists – including those with weakened land rights, women, youth, employees, and low-income individuals – as they often tend the marginal, most sensitive and degradation-prone lands.
- Design and implement adaption strategies to deal with feed and water scarcity, under a silvopastoral approach.
- Develop sound participatory grazing and silvicultural management plans to ensure the provision of ecosystem services and balance the trade-offs.
- Develop equitable, inclusive and gender-sensitive legal strategies to promote silvopastoralism.

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